Center Independent Research & Development: JPL IRAD

Validation and Sensitivity Analysis of 3D Synthetic Aperture Radar (SAR) Imaging of the Interior of Primitive Solar System Bodies: Comets and Asteroids

Completed Technology Project (2013 - 2016)

Project Introduction

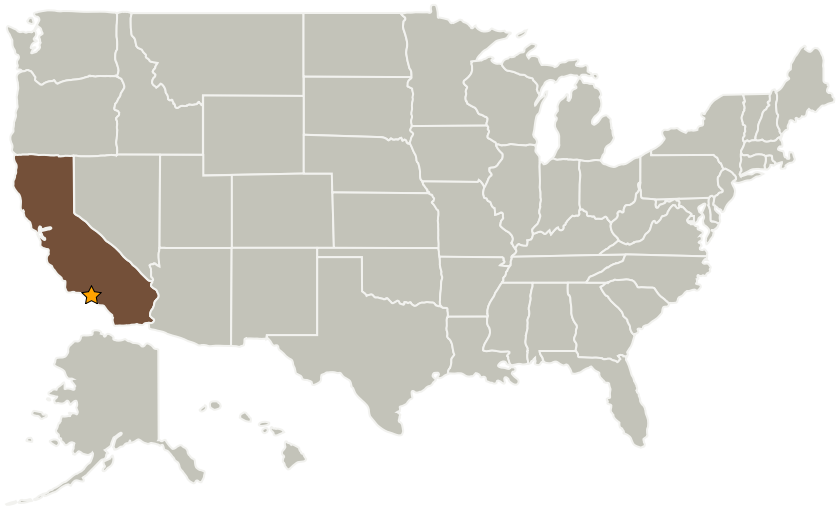
This task will demonstrate that using Radar Reflection Imager Instrument in an orbing platform , we can perform 3D mapping of the Cometary Nucleus.

To probe the interior of a comet, we are going to employ Radar Reflection Imager (RRI) Instrument on an orbiting platform. While orbiting around the comet at a safe distance of about 20 kilometers , the RRI will transmit electromagnetic waves and receive returned signals from the comet 's surface and the interior. After operating RRi for about 45 days, we would collect almost a million data sets from all sides of the comet. We will develop a technique which will allow us to process the million data sets altogether in order to construct Computer Aided Tomography-like images of the cometary nucleus.

Anticipated Benefits

Enables new instrument concepts for planetary and earth missions

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California

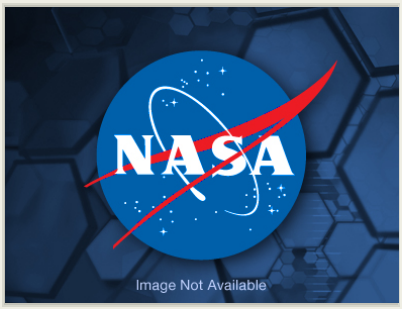


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Table of Contents

Validation and Sensitivity Analysis of 3D Synthetic Aperture Radar (SAR) Imaging of the Interior of Primitive Solar System Bodies: Comets and Asteroids

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Primary U.S. Work Locations
California

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Independent Research & Development: JPL IRAD

Project Management

Program Manager:

Fred Y Hadaegh

Project Manager:

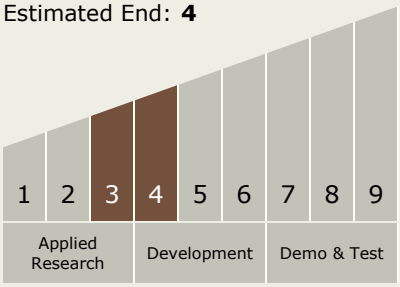
Jonas Zmuidzinas

Principal Investigator:

Yonggyu Gim

Technology Maturity (TRL)

Start: **3**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves